JUSEK, V.

"Prevention as the Main Factor in the Fight Against Sterility in Cattle" p. 937,
(ZA SOCIALISTICKE ZEMEDELSTVI, Vol. 2, no. 7, August 1952, Praha, Czechoslovakia).

SO: Monthly List of East European Accessions, LC, Vol 2, No. 11, Nov. 1953, Uncl.

SOBEK, V.

"Milk as a Diluter of Bull Semen Used in Artificial Insemination." p. 475. (SBORNIK. ANIMALS. RADA A., Vol. 26, no. 5, Nov. 1953, Praha, Czechoslovakia)

So: Monthly List of East European Accessions, LC, Vol. 3, No. 5, May 1954/Unclassified

SOBEK, /.

CZECHOSLOVAKIA / Farm Animals, Cattle   Q-2

Abs Jour: Ref Zhur-Biol., No 2, 1958, 7148

Author : Sobek
Inst   : Not given
Title   : The Fecundation Ability of the Semen of Bulls
          and Feeding with Linseed Cake

Orig Pub: Veterinarstvi, 1957, No 3, 74-75.

Abstract: The introduction of 0.25 kilograms of linseed cake
          into the daily rations of bulls decreased the
          fecundation of artificially inseminated cows
          by 4-6 percent, while the introduction of 0.5
          kilograms of linseed cake reduced it by 1-34 per-
          cent. These observations were confirmed in ex-
          periments with rams. It is believed that the
          above-described phenomenon is due to the presence
          of prussic acid in the linseed cake.

Card 1/1

7

SOBEK, V.;SLONCOVA, M.

Pharmacology of perocillin. Cas. lek. cesk. 92 no.22:603-606 29 May
1953.   (CLML 24:5)

l. Of the Institute of Pharmacology of Charles University, Prague.

Sobek, Vojtech

CZECH

1 Applicability of Dormiphen for sleep therapy from the pharmacological point of view. Vojtěch Sobek, Marie Sisncová, and R. Lukeš (Farmakol. ústav, Prague). Časopis Lékařů Českých 93, 532-6(1954).—Among the narcotics studied, Amytal Na (I) and Dormiphen (cyclohexenylethylbarbituric acid) (II) were more toxic than Bromisoval (III) and Evipan (IV) in mice (LD$_{50}$ 0.27 for I and 0.32 g./kg. for II). Chronic toxicity tests showed no significant differences. The hypnotic activity of III and IV is less than that of I and II. There was no remarkable difference between I and II as far as the influence on blood pressure, body temp., and glycemic curve was concerned. The activity of II decreased during long-term administration. II can be substituted by I for the purposes of sleep therapy, III can be used as an adjuvant.   Ivo M. Hais   (2)

SOBEK, Vojtech, Dr.; LOJDA, Zdenek; LUKES, Rudolf; JELINEK, Jiri

Pharmacology of aureomykoin. Cas. lek. cesk. 94 no.51:1396-
1404 16 Dec 55.

1. Z katedry farmakologie a pokusne pathologie fakulty detskeho
lekarstvi KU v Praze (predn. doc. Dr. H. Raskova) z embryologickeho
ustavu lekarske fakulty KU v Praze (predn. prof. Dr. Z. Frankenberger)
z Ustavu pro epidemiologii a mikrobiologii (predn. prof.
Dr. K. Raska).
        (CHLORTETRACYCLINE,
            pharmacol. of Czech. prod.)

RASKOVA, Helena; SOBEK, Vojtech

Effect of typhoid endotoxin on exteroceptive and interoceptive
reflex processes. Cesk. epidem. mikrob. imun. 5 no.6:292-294
Nov 56.

1. Katedra farmakologie a pokusne pat hologie fakulty detskeho
lekarstvi v Praze.
    (SALMONELLA TYPHOSA,
       endotoxin, eff. on blood pressure in animals (Cz))
    (BLOOD PRESSURE, effect of drugs on,
       typhoid endotoxin in animals (Cz))

SOBEK, V.; RASKOVA, H.

Effect of typhoid toxin on ganglionic stimulation transmission. Cesk.
fysiol. 7 no.3:274 May 58.

1. Katedra farmakologie a pokusne patologie fakulty detskeho lekarstvi,
Praha.

(GANGLIA, AUTONOMIC, eff. of drugs on,
typhoid toxin, on impulse transm. (Cz))
(SALMONELLA TYPHOSA,
toxin, eff. on autonomic ganglia impulse transm. (Cz))

SOBEK, Vojtech

Effects of chlortetracycline on the interoceptors. Cas. lek. cesk.
07 no.34:1057-1059 22 Aug 58.

1. Katedra farmakologie a pokusne pathologie fakulty detskeho lekarstvi
Karlovy university, prednosta prof. Dr. Helena Raskova.
        (CHLORTETRACYCLINE, eff.
                on interoceptive responses to acetylcholine (Cz))
        (NERVE ENDINGS, eff. of druga on
                chloretetrcycline on interoceptive responses to acetylcholine
                (Cz))
        (ACETYLCHOLINE, eff.
                interoceptive responses, eff. of chlortetracycline (Cz))

SOBEK, V.; KRATOCHVILOVA, V.

Effect of chlortetracycline on growth. Cas. lek. cesk. 97 no.43:1365-1367 24 Oct 58.

1. Katedra farmakologie a experimentalni pathologie, prednosta prof. MUDr H. Raskova Ustav epidemiologie a mikrobiologie prednosta Prof. MYDr. K. Raska.
(GROWTH, eff. of drugs on
    chlortetracycline in young rats (Cz))
(CHLORTETRACYCLINE, eff.
    on growth in young rats (Cz))

SOBEK, V.; HAVA, M.

Mechanism of action of penethamate hydroiodide (penester). Cas. lek.
cesk. 98 no.5:147-150 30 Jan 59.

1. Katedra farmakologie a pokusne patologie fakulty detskeho lekarstvi,
Farmakologicka laborator CSAV, Praha, prednosta prof. MUDr. H. Raskova.
V. S., Praha 2, Albertov 4.
          (PENICILLIN, eff.
              penicillin G diethylaminoethyl ester hydroidide, spasmolytic
              eff., comparison with procaine (Cz))
          (PROCAINE, eff.
              spasmolytic eff., comparison with penicillin G diethylaminoe-
              thyl ester hydroiodide (Cz))
          (SPASM
              spasmolytic eff. of penicillin G diethylaminoethyl ester hy-
              droidide & procaine, comparison)

SOBEK, V.

Influence of chlortetracycline on the macroorganism. Antibiotiki (MIRA 13:7)
5 no.1:100-102 Ja-F '60.

1. Kafedra farmakologii i eksperimental'noy patalogii (zav. - prof. Ye. Rashkova) pediatricheskogo fakul'teta Karlova universiteta, Praga, Chekhoslovakiya.   (CHLORTETRACYCLINE)

SOBEK, V.

Effect of chlortetracycline on Clostridium perfringens toxin intoxication. Cesk. fysiol. 9 no.1:90 Ja 60.

1. Katedra farmakologie fakulty detsk. lek. KU, Praha.
    (CHLORETETRACYCLINE pharmacol.)
    (TOXINS AND ANTITOXINS)
    (CLOSTRIDIUM PERFRINGENS)

SOBEK,V.

Contribution to the influence of growth by chlortetracycline.
Cesk.fysiol. 9 no.3:299 My '60.

1. Katedra farmakologie fak. detsk. lek. KU, Praha.
        (CHLORTETRACYCLINE pharmacol)
        (GROWTH)

SOBEK, V.

Effect of barbiturates on reflex arrest of peristalsis. Farm.i
toks. 23 no.1:17-20 Ja-F '60.   (MIRA 14:3)

1. Kafedra farmakologii i eksperimental'noy patologii pediatriche-
skogo fakul'teta Universiteta imeni Karla IV v Prage (zav. - prof.doktor
Yelena Rashkova).
          (BARBITURATES)   (ALIMENTARY CANAL)

CSSR

SOBEK, V.

no academic degree indicated

Dept. of pharmacology and experimental pathology of the Faculty of Pediatrics,"
   Charles University (Katedra farmakologie a pokusne pathologie fakulty detskeho
   lekarstvi Karlovy University), Prague, director: Prof. H. RASKOVA, MD, ScD.

Bratislava, Bratislavske Lekarske Listy, No 1, 1963, pp 24-34

"On the Problem of the Protective Effect of Chlortetracycline on Bacterial Toxins"

FDRL, Yu.) AUTHOR

Study of agreement of the magnetic target effect of some
drugs. Med. from. 13 no.1:199-202 S '62.

1. . . . .
Ramdas church faculty detishen [akanshai] factory uni-
versity, India.

On the question of the purification action of reparit... ...jecti.
Bucemonie., 13 ... 3894-398 96/

1, Laboratory for Research on the Pathology, Therapy and Preven-
tion of Infectious Diseases, Faculty of Pediatrics, Charles
University, and Institute of Industrial Hygiene and Occupational
Diseases, Prague.

SOBEK,V.; KARGEROVA, A.; PADEVET, M.

Effect of pyrocatechin on the detoxication of neomycin. Bratisl.
lek. listy 45 no.3:142-146 15 F '65.

1. Laborator pro vyzkum pathologie, terapie a prevence infekcnich
chorob; Fakulty detskeho lekarstvi Karlovy univerzity v Praze
(reditel: prof. MUDr. J. Prochazka, DrSc.).

SOBEL, Ladislav

SURNAME (in caps); Given Names

②

Country: Czechoslovakia

Academic Degrees: MUDr

Affiliation: Clinic of Pulmonary Ailments and Tuberculosis (Klinika pro choroby plicne a tuberkulozne), Medical Faculty (LF [lekarske fakulty]), UPJS [abbreviation not identified], Kosice; Chief (Prodnosta): MUDr Ladislav Sobel

Source: Prague, Rozhledy v Tuberkulóse a v Nemocech Plicnich, Vol XXI, No 7, August 1961, pp 540-544

Data: "The Problem of Diffuse Interstitial Pulmonary Fibrosis."

/0/

CZECHOSLOVAKIA

SOBEL, Lad.

MD

Regional Institute of Public Health (KUNZ), Pulmonary Clinic of
Faculty Hospital (plucna klinika fakultnej nemocnice), Kosice;
Head: Lad. SOBEL, MD

Prague, Rozhledy v tuberkulose a v nemocech plicnich, No 9, Oct 62,
pp 687- 692

"The Incidence and Pathogenesis of Extensive Pulmonary Tuberculosis
in the Territory of Former Kosice Region."

Co-authors:

MATEJNY, B., no degree indicated; Sanatorium for Pulmonary Tubercu-
losis (Liecebna plucnej tbc), Kvetnica pri Poprade;
Director: Jozef NEUMANN, MD.
SZABO, T., no degree indicated; Department for Tuberculosis of the
Hospital of the Okres Institute of Public Health (Tbc oddelenie
nemocnice OUNZ), Roznava; Director: Ladislav JUST, MD.

1/2

HUNGARY

KRAKOVITS, Gabor, SOBEL, Matyas, and GOTTHARD, Lajos; Department of Orthopedics
(Orthopaediai Osztaly) of the Janos Hospital (Janos Korhaz) [Budapest].

"Sexual Differences in the Hip-Joint Flexibility of New-Born Animals"

Abstract: Using the method described by Crelin, the authors demonstrated the
existence of sexual differences in the hip-joint flexibility of new-born animals.
In the case of female animals (rats, hamsters, guinea pigs) the flexibility
of the hip joint is greater, even from a physiological viewpoint, than in male
animals. These findings are related to the fact that the incidence of hip
sprain or dysplasia in young girls is higher than in boys. The sexual difference
in the flexibility of the hip joint is attributed, on the basis of literature
data, to a hormonal effect. 15 References, all Western. Manuscript received
27 Dec 65.

1/1

SOBELMAN, I. I.   3

B. T. R.
Vol. 3 No. 4
Apr. 1954
Physics

5616   Line Width of Rayleigh Scattering in Gases. I. I.
Sobelman. National Science Foundation Translation, no. 34,
July 1953, 5 p. (Original in Doklady Akademii Nauk SSSR, v.
88, 1953, p. 653.)
Presents a detailed quantum-mechanical study of scattering by
a single molecule in cases of radiation and pressure damping.
6 ref.

PA 249T5

SOBEL'MAN, I. I.

USSR/Physics - Raleigh Scattering   1 Feb 53

"Width of Line of Raleigh Scattering in Gas," I. I.
Sobel'man, Phys Inst imeni Lebedev, Acad Sci USSR

DAN SSSR, Vol 88, No 4, pp 653-656

Analyzes quantum-mechanical discussion of scattering
by an individual mol in case of radiative and colli-
sional damping of natural oscillations. Dependence
of width of Raleigh line of coherent scattering in
gas on pressure is reflected by a certain indirect
effect connected to Doppler widening (see V. L.
Ginzburg, ibid. 30 (1941)). Indebted to Acad
G. S. Landsberg and Prof V. L. Ginzburg. Presented by
Acad G. S. Landsberg 3 Dec 52.

249T55

SOBEL'MAN, I. I.

5

(2)

Broadening of spectrum lines by quadrupole Stark effect.
I. I. Sobel'man and L. A. Vainshtein. Doklady Akad.
Nauk S.S.S.R. 90, 757-60(1953)(Engl. translation issued
as U.S. Atomic Energy Comm. NSF-tr-161, 5 pp.(1954)).—
The equation for quadrupole Stark broadening of spectral
lines is derived for an atom with one or two valence electrons
and a quant. estimate is made for solar lines of Na, Ca,
and Ca⁺. William F. Meggers

10-14-54

USSR/ Nuclear Physics - Spectroscopy

Card 1/1   Pub. 118 - 3/6

Authors   : Sobel'man, I. I.

Title   : The theory regarding the width of atomic spectral lines

Periodical   : Usp. fiz. nauk 54/4, 550-586, Dec 1954

Abstract   : The theory of widening spectral lines as result of the reaction of the
atom with its surrounding particles,. other atoms and molecules, ions and
electrons is discussed. The basic concepts of the theory, namely, the
impact concept (Lorenz, Lenz, Veyskop), and the statistical concept
(Holzmark, Kuhn and Margenau), are explained. Analysis of numerous ex-
perimental facts showed that both the impact and statistical theories
are in a position to give a satisfactory explanation of many physical
problems involving the widening of atomic spectral lines. Sixty ref-
erences: 16 USSR; 28 USA; 4 Polish; 12 German (1924-1954). Graphs.

Institution: .....

Submitted: .....

SOBEL'MAN, I.I.

USSR/Physics - Spectral line theories

Card 1/1   : Pub. 22 - 11/44

Authors   : Sobel'man, I. I.

Title   : On a correlation between the statistical and the impact theories
              on the width of spectral lines

Periodical : Dok. AN SSSR, 98/1, 43-45, Sep 1, 1954

Abstract   : There are two theories on the widening and intensity of spectral
              lines - the impact theory and the statistical theory. Cases and
              the limits to which one or the other theory can be applied more
              effectively are considered. Eleven references (1919-1951).
              Diagram.

Institution : .....

Presented by : Academician G. S. Lindberg, April 17, 1954

SOBEL'MAN, I. I.

SOBEL'MAN I. I.--"Some Problems in the Theory of the Width of Spectral Lines." Acad Sci USSR. Physics Inst imeni P. N. Lebedev. Moscow, 1955. (Dissertation for the Degree of Candidate of Physicomathematical Sciences).

SO: Knizhnaya Letopis' No. 27, 2July 1955

SOBELMAN, I. I.

Broadening of spectral lines due to collisions with electrons. I. I. Sobelman. Optika i Spektroskopiya 1, 617-26(1956).—Theoretical. The broadening of spectral lines was studied and general expressions were derived which det. the effective cross section of the broadening and the shift of the lines through the scattering phase. These expressions, in the quasiclassical approximation become the well-known formulas of Weisskopf's classical theory (C.A. 50, 56a).   —J. Royter Leach.

USSR/Physical Chemistry - Molecule. Chemical Bond, B-4

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 60766

Abstract: if $1/\tau_0 \ll a_n$. In the problem of widening due to pressure the role of a_n is played by maximum displacement of frequency on collision $c_n \rho^n$, when ρ -- is the sighting distance, $1/\tau_n$ a quantity inverse to the duration of collision. Distribution of intensity between regions $\omega - \omega_0 > \Omega$ and $\omega - \omega_0 < \Omega$ depends upon density of disturbing particles N, although Ω does not depend on N. In Doppler widening the role of a_n is played by displacement of frequency of emission of the atom moving at velocity v, equal to $\Delta\omega = \omega_0 v/c$, in which v retains a constant value v_n during the time of free travel τ_n, i.e., v_n and τ_n are random independent variables. Statistical expression of Doppler widening holds with $v_n(\omega_0/c) =$ $\tau_n \gg 1$ or $L \gg \lambda$, where L is length of free travel, λ - wave length. With $L < \lambda$ distribution of intensity is dispersional, analogous to the impactal of width $2/\tau_0$ where τ_0 is gasokinetic time of free travel. The last mentioned result is of significance in the case of lines of combination spectra in gas corresponding fully symmetrical oscillations of dipole-free molecules for which the effective diameter of widening can be smaller than the gaso-kinetic.

Card 2/2

SUBJECT   USSR / PHYSICS
AUTHOR   SOBEL'MAN, I.I.
TITLE   The Broadening of Spectral Lines as a Result of Collisions with Electrons.
PERIODICAL   Žurn. eksp. i teor. fis, 31, fasc.3, 519-520 (1956)
             Issued: 12 / 1956

Collisions with electrons probably play an important part on the occasion of the broadening of atomic lines in the plasm. Besides, some atomic lines of metals in stellar atmospheres are probably mostly broadened by electrons. However, the present theory on the breadth of spectral lines is not applicable to electrons because it is based on the quasiclassical character of the relative motion of the atom and of the disturbing particle (which is true only in the case of heavy particles). The computation of the shape of the lines broadened by the interaction between the atom and surrounding particles reduces itself to the computation of the integral $A = \int \prod_i \Psi_{n"i} \Psi_{n'i} dr_i$. Here $\Psi_{n'i}$ and $\Psi_{n"i}$ denote the wave functions of the relative motion of the atoms and of the electrons in the initial and in the final state of the atom. The computation of A is made considerably more simple by assuming broadening by electrons to be shock-like. In the course of integration it is possible to use simple asymptotic expressions, and computation can be carried out in a general form up to the end, which is a fact of essential importance. The correctness of several American works dealing with this subject (B.KIVEL, H.MARGENAU) is doubted. According

SOBEL'MAN, I. I.

[Broadening of spectra lines due to collisions with elec-
trons] I. I. Sobel'man. *Soviet Phys. JETP* 4, 453-6
(1957)(English translation].—See C.A. 51, 9292a.
                                                    B. M. R.

PHASE I BOOK EXPLOITATION   SOV/1700

24(7)
Lvov. Universitet

Materialy X Vsesoyuznogo soveshchaniya po spektroskopii, 1956.
t. II: Atomnaya spektroskopiya. (Materials of the 10th All-Union
Conference on Spectroscopy, 1956. Vol 2: Atomic Spectroscopy)
[Lvov] Izd-vo L'vovskogo univ., 1958. 568 p. (Series: Its:
Vaidelenddy sbornik, vyp.4(9)) 3,000 copies printed.

Additional Sponsoring Agency: Akademiya nauk SSSR. Komissiya po
spektroskopii.

Editorial Board: G.S. Landsberg, Academician, (Resp. Ed.);
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Glauberman, Doctor of Physical and Mathematical Sciences; A.Ye.
Ed.: S.L. Gazer; Tech. Ed.: T.V. Saranyuk.

PURPOSE: This book is intended for scientists and researchers in
the field of spectroscopy, as well as for technical personnel
using spectrum analysis in various industries.

COVERAGE: This volume contains 177 scientific and technical studies
of atomic spectrography presented at the 10th All-Union Confer-
ence on spectroscopy in 1956. The studies were carried out by
members of scientific and technical institutes and include
extensive bibliographies of Soviet and other sources. The
studies cover many phases of spectroscopy: spectra of rare earths,
electromagnetic radiation, physicochemical methods for controlling
uranium production, physics and technology of gas discharge,
optics and spectroscopy, abnormal dispersion in metal vapors,
spectroscopy and the combustion theory, spectrum analysis of ores
and minerals, photographic methods for quantitative spectrum
analysis of metals and alloys, spectral determination of the
hydrogen content of metals by means of isotopes, tables, and
atlases of spectral lines, spark spectrographic analysis,
statistical study of variation in the parameters of calibration
curves, determination of traces of metals, spectrum analysis in
metallurgy, thermochemistry in metallurgy, and principles and
practice of spectrochemical analysis.

Card 2/31

....-..... ...... (......)

Rudnevskiy, N.K., and Yu.S. Kalinin. Experimental Study of
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in Some Binary Alloys   298

Sobel'man, I.I. Widening of Spectral Lines Due to Collisions
with Electrons   303

Mazing, M.A., and S.L. Mandel'shtam. Widening and Shift of
Spectral Lines in the Plasma of a Gas Discharge   305

Miayukas-Miayunas, A.A. Effect of Temperature on the Widening
of Cadmium and Thallium Spectral Lines in the Presence of a
Foreign Gas   308

Kitayeva, V.F., and N.N. Sobolev. Spectral Line Widening in a
D-C Electric Arc   312

Ostrovskiy, Yu.I., O.P. Parchevskiy, and N.P. Penkin. Relative
Magnitude of Oscillator Energies in Titanium and Manganese
Atomic Spectra   316

Card 18/31

SOBEL'MAN, I.I.

      Theory of spectrum line breadth. Trudy Fiz.inst. 9:313-359 '58.
                                                (MIRA 11:11)

          (Spectrum analysis)   (Quantum theory)

AUTHORS: Sobel'man, I. I., Feynberg, Ye. L.

TITLE: The Optical Effects of the Collective Oscillations of Electrons in Metals (Opticheskiye effekty kollektivnykh kolebaniy elektronov v metallakh)

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1958, Vol. 22, Nr 6, pp. 654-658 (USSR)

ABSTRACT: It may be concluded from results obtained by theoretical research that in a homogeneous plasma with atrophic electron gas, besides the Fermi excitation spectrum of the individual electrons also a Bose excitation spectrum may be observed. In this case the "plasmons" are concerned, the frequency ω and wave number k of which depend on the conditions of dispersion:

$$\omega^2 = \omega_p^2 + \langle v^2 \rangle k^2, \quad \omega_p^2 = \frac{4\pi ne^2}{m}$$

where e, m, n denote the charge, the mass, and the electron number respectively; $\langle v^2 \rangle$ - mean square of the velocity of the electrons in the non-excited Fermi gas. By entering into interaction with individual electrons, the plasmons quickly pass

Card 1/2

The Optical Effects of the Collective Oscillations   SOV/48-22-6-3/28
of Electrons in Metals

over to single electron excitations, which makes a constancy of
plasmons possible only in the case of very long waves. On this
basis the theory concerning electron losses of plasmons and the
system of plasmon equations are developed. The following subjects
are further dealt with by separate chapters: 1.) Excitation of
the plasmon during the absorption of X-ray quanta and its in-
fluence upon the fine structure of the limit of X-ray absorption.
2.) The combined scattering of X-ray quanta with plasmon yield.
3.) Light absorption on the plasmon frequency. There are 13
references, 7 of which are Soviet.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR
               (Physics Institute imeni P. N. Lebedev, AS USSR)

               1. Metals--Properties   2. Electron gas--Spectra   3. Electron
               gas--Optical effects   4. Radiation--Absorption   5. Mathematics
               --Applications   6. Perturbation theory

Card 2/2

SOV/48-22-6-20/28

AUTHORS: Vaynshteyn, L. A., Koloshnikov, V. G., Mazing, M. A., Mandel'shtam, S. L., Sobel'man, I. I.

TITLE: On the Broadening and Displacement of Spectral Lines in a Highly Ionized Plasma (Ob ushirenii i sdvige spektral'nykh liniy v vysokoionizovannoy plazme)

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1958, Vol. 22, Nr 6, pp. 718-719 (USSR)

ABSTRACT: The investigation of the breadth and shape of spectral lines does not characterize the excitation of atoms with sufficient accuracy, and therefore an investigation of the breadth and the displacement of the lines is more advantageous for determining the causes of these phenomena. The principal cause of the broadening and displacement of spectral lines in a highly ionized plasma is its interaction with charged particles. For lines with quadratic Stark effect the impact theory of broadening results in the following expressions for the breadth of lines and their displacement:

$$\gamma = 11.4 C_4^{2/3} v^{1/3} N, \quad \Delta = 9.80 C_4^{2/3} v^{1/3} N,$$

where C_4 denotes the constant of the quadratic Stark effect,

Card 1/3

On the Broadening and Displacement of Spectral
Lines in a Highly Ionized Plasma

v - velocity, N - the density of the excited particles. Herefrom
it follows that the ratio between the breadth and the displacement
of $C_4 \cdot \tau$ and N is independent and equal to: $\gamma/\Delta = 1.46$. In the
case of interaction of a different kind, as e.g. according to the
equation by Van der Vaal $\gamma/\Delta = 2.8$. The task to be carried
out by the present paper was to find a correct explanation of the
interaction between radiating atoms and charged particles, i.e. of
the applicability of the aforementioned γ- formula with respect
to the lines with quadratic Stark effect. As objects the lines
Ar II, which are excited in the channel of the spark discharge,
were selected. Measurements of breadths and displacements of lines
were carried out photographically. Results are given by a table.
By checking these results it was found that those obtained by ex-
periment contradicted theoretical results completely. This is ex-
plained by the fact that the initial expression for the displace-
ment of the frequency of the atom oscillator $\Delta\omega = C_4/R^4$, where
R denotes the distance to the exciting electron, is not applicable
in this case because the electrons playing the principal part in

Card 2/3

On the Broadening and Displacement of Spectral
Lines in a Highly Ionized Plasma

SOV/48-22-6-20/28

the broadening of the lines form a Weisskopf radius that is too
small. The field formed by the electrons turns out to be so
strong on this occasion that the Stark effect ceases to be
quadratic and goes over to linearity. There is no reason to be-
lieve that the field changes slowly and is quasistatic as is
alleged by a well-known theory. The problem is still being dis-
cussed. There are 1 table and 3 references, 2 of which are Soviet.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR
(Physics Institute imeni P. N. Lebedev, AS USSR)

1. Spectroscopy   2. Electron gas--Spectra   3. Perturbation
theory

Card 3/3

SOV/48-22-9-4/40

AUTHOR: Sobel'man, I. I.

TITLE: On the Quantum-Mechanical Theory of the Line Intensity in
              the Combination Dispersion (O kvantovomekhanicheskoy teorii
              intensivnosti liniy kombinatsionnogo rasseyaniya)

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1958,
              Vol 22 , Nr 9, pp 1026 - 1029 (USSR)

ABSTRACT: In the theory of molecule spectra usually following
              formula is usually made the starting point for the
              wave function of the molecule (Refs 1,2):

$$\psi_n^v (\vec{r}, Q) = \psi_n (\vec{r}, Q) \, U_n^v (Q)$$

              It seems to be quite possible to considerably simplify
              the wave function of the zero-th approximation. As
              the interaction of the nuclei with the radiation is
              insignificant the interaction of the molecules with the
              light in the dispersion process is completely determined
              by the electrons. Because of the Coulomb (Kulon) inter-
              action of electrons and nuclei the energy of the radiation

Card 1/4

On the Quantum-Mechanical Theory of the Line Intensity
in the Combination Dispersion

$$W(\vec{r}, \delta\vec{R}) = \sum_i (\partial H / \partial \vec{R}_i) \delta\vec{R}_i = \sum_{i,\alpha} (\partial H / \partial \vec{R}_i) \vec{C}_{i\alpha} Q_\alpha \quad (4).$$

By means of this equation $\beta_{\rho\sigma}$ can be represented as follows:

$$\beta_{\rho\sigma} = (Q_\mu)_{01} \sum_i \vec{C}_{i\mu} \vec{B}^i_{\rho\sigma} = \sum_i \vec{B}^i_{\rho\sigma} \delta\vec{R}^\mu_i \quad (5).$$

The representation of $\beta_{\rho\sigma}$ in the form of (3) and (5)
turns out to be very useful in the solution of various
problems (Ref 8). The formula (5) can quite simply be
generalized to such a case if the molecule is exposed
to external influences. If the electron functions
of the zero-th approximation are sufficiently simple
$\beta_{\rho\sigma}$ can be computed directly from (3). There are 1 figure
and 8 references, 7 of which are Soviet.

Card 3/4

On the Quantum-Mechanical Theory of the Line Intensity   SOV/48-22-9-4/40
in the Combination Dispersion

ASSOCIATION: Moskovskiy fiziko-tekhnicheskiy institut (Moscow
              Physical and Technical Institute)

Card 4/4

AUTHORS: Sobel'man, I. I., Feynberg, Ye. L.   56-2-29/51

TITLE: Some Optical Effects of Plasma Vibrations in a Solid Body
                (Nekotoryye opticheskiye effekty plazmennykh kolebaniy v
                tverdom tele)

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1958,
                Vol 34, Nr 2, pp 494-500 (USSR)

ABSTRACT: In the plasma of free electrons in a solid body collective
                vibrations of two different kinds are possible: optically
                active (which absorb light and are fluorescent) and optically
                inactive vibrations. With both kinds of vibrations, however
                an indirect interaction with light is possible. The authors
                investigate the following processes: 1) The excitation of a
                plasma by the absorption of a γ-quantum. This process is of
                importance for the structure of the absorption edge. 2) The
                excitation of a plasmon in the inelastic scattering of a
                photon (combination scattering). 3) The absorption of light
                at the frequency of optically inactive plasma vibrations by
                the virtual excitation of one of the inner electrons. All
                these processes are caused by the Coulomb interaction of a
Card 1/3

Some Optical Effects of Plasma Vibrations in a Solid Body   56-2-29/51

plasma with the inner electrons; the corresponding
probabilities are quite considerable. For the sake of safety
it is assumed here that the inner electron is situated on
the K-shell. The separate chapters of this work deal with
the edge of the band of γ-absorption, the combination
scattering and the absorption at the frequency of plasma
vibrations. The results found in these investigations are
discussed afterwards. The mechanism investigated for the
excitation of the plasmons in the absorption of γ-quanta
is very effective. The authors also determine in which way
this process can influence the structure of the absorption
limit. The combination scattering is also sufficiently
effective. Therefore the appearance of long-wave satellites
can be ovserved in the reflected (dispersed) light. The
division of plasma vibrations into optically active and
optically inactive ones is rather done at random and only
separates the mechanisms of the processes from each other.
Besides these investigated optical effects which are con-
nected with the excitation of the plasmon also other
processes can occur, e. g. the radiation of a γ-quantum at
the transition $n's \rightarrow n''s$. All processes investigated are,
in principle, also possible when a second electron takes

Card 2/3

Some Optical Effects of Plasma Vibrations in a Solid Body   5 -2-2./51

part in them in stead of the plasmon. There are 8
references, 3 of which are Slavic.

ASSOCIATION: **Institute of Physics** imeni P. N. **Lebedev, AS** USSR
(Fizicheskiy institut imeni P. N. Lebede.a Akademii nauk
SSSR)

SUBMITTED: August 27, 1957

AVAILABLE: Library of Congress

1. Plasma oscillations-Optical effects   2. Photons-Scattering

Card 3/3

SoBeLMAN, I. I.

21(0),24(0)   PHASE I BOOK EXPLOITATION   SOV/3

Akademiya nauk SSSR. Fizicheskiy institut

Issledovaniya po eksperimental'noy i teoreticheskoy fizike; [sbornik] (Studies on Experimental and Theoretical Physics; Collection of Articles) Moscow, Izd-vo AN SSSR, 1959. 304 p. Errata slip inserted. 2,300 copies printed.

Ed.: I. L. Fabelinskiy, Doctor of Physical and Mathematical Sciences; Eds. of Publishing House: A. L. Chernyak and V. G. Berkgaut. Tech. Ed.: Yu. V. Rylina; Commission for Publishing the Collection in Memory of Grigoriya Samuilovich Landsberg: I. Ye. Tamm (Chairman), Academician; M. A. Leontovich, Academician; P. A. Bazhulin, Doctor of Physical and Mathematical Sciences; S. L. Mandel'shtam, Doctor of Physical and Mathematical Sciences; I. L. Fabelinskiy, Doctor of Physical and Mathematical Sciences; P. S. Landsberg-Baryshanskaya, Candidate of Physical and Mathematical Sciences; and G. P. Motulevich (Secretary), Candidate of Physical and Mathematical Sciences.

PURPOSE: This book is intended for physicists and researchers engaged in the study of electromagnetic radiations and their role in investigating the structure and composition of materials.

COVERAGE: The collection contains 30 articles which review investigations in spectroscopy, sonics, molecular optics, analytical physics, nuclear physics, and other branches of conductor physics. The introductory chapter gives a biographical profile of G. S. Landsberg, Professor and Head of the Department of Optics of the Division of Physical Technology at Moscow University, and reviews his work in Rayleigh scattering, combat gases, spectral analysis of metals, etc. No personalities are mentioned. References accompany each article.

SOBEL'MAN, I.I.

66702

24.2/20

SOV/109-4-8-22/35

AUTHORS: Granovskiy, V.L., Luk'yanov, S.Yu., Spivak, G.V., and Sirotenko, I.G.

TITLE: Report on the Second All-Union Conference on Gas Electronics

PERIODICAL: Radiotekhnika i elektronika, 1959, Vol 4, Nr 8, pp 1339 - 1358 (USSR)

ABSTRACT: The conference was organised by the Ac.Sc.USSR, the Ministry of Higher Education and Moscow State University.
A.A. Timofeyev - "Measurement of the Gas Density During the Dynamic Operation of a Discharge" (see P 1306 of the journal).A.V. Nedospasov - The Nature of a Striated Positive Column".
V.I. Pere1' and Yu.M. Kagan - "The Theory of Probes for Arbitrary Pressures".
Yu.M. Kagan et al. - "The Positive Column of a Discharge in a Diffusion Regime".
M.V. Konyukov - "Influence of the Process of the Annihilation of the Negative Ions on Their Concentration in the Column".
M.D. Gabovich and L.L. Pasachnik - "Anomalous Scattering, Excitation of Plasma Oscillations and Plasma Resonance".
Yu.L. Klimontovich - "Energy Lost by Charged Particles for the Excitation of the Oscillations in Plasma (the Langauer paradox) and "The Theory of Non-linear Plasma Oscillations".
Io.G. Martinkov and I.G. Nekrashevich - "Dependence of the Temperature in the Near-electrode Region of a Pulse Discharge on the Material of the Electrodes".
N.A. Neretina and B.N. Klyarfeld - "Formation of Light Spots on the Anode of a Gas Discharge (see p 1301 of the journal).
N.A. Matveyeva -"Distribution of Binary Mixtures of Inert Gases in a d.c. Discharge".
V.G. Stepanov and V.P. Zakharchenko - "Some Phenomena in Rarified Plasma".
V.G. Stepanov and V.S. Bazel- "The Possibility of Obtaining Highly Concentrated Plasmas".
G.V. Smirnitskaya and E.M. Reykhrudel - "Some Characteristics of the Discharge in an Ion Pump and in a Magnetic Ionisation Vacuum Gauge".
Ye.T. Kucherenko and O.K. Nazarenko - "Properties of a Discharge with Electron Oscillations in a Magnetic Field" (see p 1255 of the journal).
The paper by L.M. Biberman and B.A. Veklenko considered the approximate methods for determining the concentration of atoms at the radiation levels.
I.I. Sobelman and L.A. Vaynshteyn read a paper on "A Non-stationary Theory of the Stark Broadening of the Spectral Lines in Plasma".
M.A. Mazing and S.L. Mandelshtam -- "The Broadening and the Shift of Spectral Lines in a Gas-discharge Plasma".
R. Lunt (England) - "The Kinetics of Electron Collisions Leading to the Excitation of the Molecular Hydrogen in a Hydrogen Discharge".
V.I. Kolesnikov et al. - "Some Properties of the Arc Discharge in an Atmosphere of Inert Gases".
A.A. Mak and M.P. Vanyukov - "Production of High Temperatures By Means of Spark Discharges".

24(7), 24(3)

AUTHORS: Vaynshteyn, L.A. and Sobel'man, I.I.

SOV/51-6-4-5/29

TITLE: A Non-Stationary Theory of the Stark Broadening of Spectral Lines in
              Plasma (Nestatsionarnaya teoriya shtarkovskogo ushireniya spektral'nykh
              liniy v plazme)

ABSTRACT: Collisions of atoms with charged particles (electrons and ions) play
              an important role in broadening of atomic spectral lines in plasma.
              Theory of the effect is at the moment in an unsatisfactory state. The
              main deficiency of the theory lies in its use of the adiabatic
              approximation. The present paper describes a non-stationary quasi-
              classical theory which is free from the deficiencies of the adiabatic
              approximation. It is found that even a comparatively simple quasi-
              classical model gives the main characteristics of the mechanism of
              broadening due to fast charged particles. At velocities possessed by
              plasma electrons the spectral line broadening is due to inelastic
              collisions. The authors found that the width and displacement of lines
              at large electron velocities decrease approximately in proportion v^{-1},
              where v is the electron velocity. This means that at high electron
              velocities the role of ions becomes more important (displacement of

Card 1/2

67157

SOV/51-7-6-4/38

5.3100
5.4130

AUTHORS: Savin, F.A. and Sobel'man, I.I.

TITLE: Intensities of the Raman Spectra and the Metallic Model of a Molecule.
I. Polyene Compounds.

PERIODICAL: Optika i spektroskopiya, 1959, Vol 7, No 6, pp 733-739 (USSR)

ABSTRACT: Some properties of the molecules containing conjugated double bonds can
be satisfactorily represented using the metallic model. The present
paper describes an application of the general metallic model method of
Sobel'man (Ref 2) to calculation of the Raman spectral intensities of
polyene compounds. The results of the calculation were found to be in
satisfactory agreement with experimental data. For example the ratios
of the intensities of the ultraviolet absorption bands of butadiene,
hexatriene and octotetraene (at 47700, 39750 and 33100 cm^{-1} respectively)
were calculated to be:

$$I_{but.} : I_{hex.} : I_{oct.} = 1 : 16 : 200.$$

The experimental values (given in col 10 of a table on p 738) are:

$$I_{but.} : I_{hex.} = 1 : 10$$

i.e. they are in satisfactory agreement with the calculated intensities
(no quantitative data were available on octotetraene). The

Card 1/2

SOV/51-7-6-5/38

AUTHORS: Savin, F.A. and Sobel'man, I.I.

TITLE: Intensities of the Raman Spectra and the Metallic Model of a Molecule.
              II. Aromatic Compounds

PERIODICAL: Optika i spektroskopiya, 1959, Vol 7, No 6, pp 740-743 (USSR)

ABSTRACT: The present paper is a continuation of Part I (see the preceding
              abstract). The relative intensities of the Raman spectral lines of
              aromatic compounds are calculated using Sobel'man's metallic model
              method (Refs 1, 2); the application of this method to polyene molecules
              was described in Part I. Using benzene, toluene and deuterobenzene as
              examples, the authors show that the theoretical values are in satisfactory
              agreement with experimental data (Refs 6, 7). The paper is entirely
              theoretical. Acknowledgments are made to P.A. Bazhulin for his advice
              and to A.M. Bogomolov who made available the results of his calculations
              of the vibrational forms. There are 1 figure, 1 table and 7 references,
              6 of which are Soviet and 1 English.

SUBMITTED: March 20, 1959

Card 1/1

82826

S/048/60/024/008/002/017
B012/B067

Methods of Calculating the Cross Sections of Atom
Excitation by Electrons

for these functions is written down for the general case. The system of
equations for $F_r(r)$ is obtained from the variational principle (2). Formula
(3) for the excitation cross section is written down. It is pointed out
that the explicit form of the equations depends on the type of the approxima-
tion wave functions if exact functions are possible only in the case of a
hydrogen atom. The functions by Hartree-Fok are found to be the most
accurate, and they are recommended for practical calculations. The equations
for $F_r(r)$ show a very complicated form in the general case. It is shown
that these equations can be considerably simplified if 1) the nonortho-
gonality of the radial functions of the outer electrons and of the valence
electrons is considered, and 2) if the terms with the products of the integrals
of the nonorthogonality and the multipole interactions of second and higher
order are omitted. Formulas (4) and (5) for such a simplified system of
equations are written down and explained. It is pointed out that in most of
the calculations carried out at present, the two-state approximation was
used where system (4) was restricted to one pair of equations (6). This means

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Methods of Calculating the Cross Sections of Atom
Excitation by Electrons

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S/048/60/024/008/002/017
B012/B067

of partial spherical waves into plane waves. There are 7 references: 3 Soviet
and 4 British.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR
               (Institute of Physics im. P. N. Lebedev of the Academy of
               Sciences, USSR)

Card 4/4

82611

Negative Absorption in Metal Vapors

S/056/60/039/001/027/029
B006/B063

of the excited radiation. This effect leads to an intense sensitized fluorescence, as may be seen from the papers of Refs. 2 and 3. A mixture of sodium and mercury vapors, irradiated with Hg resonance radiation of $\lambda = 2537$ A, is taken as an example. The distances ΔE of 10 sodium levels from the resonance level 6^3P_1 Hg and their radiation width A are compiled in a Table. The levels 9^2S and 8^2P are specially discussed. In the case of exact resonance ($\Delta E = 0$) the excitation transfer cross section would be $\sigma \approx 3 \cdot 10^{-14} cm^2$; when $\Delta E \neq 0$, $\sqrt{\sigma} \Delta E / vh \sim 1$, i.e., the cross section is not reduced by more than one order of magnitude.

$3 \cdot 10^{-15} cm^2$ is therefore the lowest limit. Extinguishing collisions are shown to be negligible. A formula is given and briefly discussed for N_{8p}, the absolute sodium concentration on the 8^2P level. For the transitions $n^2S - 8^2P$ and $n^2D - 8^2P$ the absorption coefficient, k, is negative. A formula is given for the calculation of $|k|$. For the transition $8^2S - 8^2P$ ($\lambda = 30.2\mu$), $|k| = 2$, and for $7^2S - 8^2P$ ($\lambda = 7.77\mu$), $|k| = 0.02$. Finally, the authors thank P. A. Bazhulin for his discussions. There are

Card 2/3

S/056/60/039/003/029/045
B006/B063

AUTHORS: Vaynshteyn, L. A., Sobel'man, I. I.

TITLE: Deduction of the Radial Equations of the Theory of Colli-
             sions Between Electrons and Atoms

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960,
             Vol. 39, No. 3(9), pp. 767-775

TEXT: The various perturbation-theoretical methods used for calculating
the cross sections of atomic excitation by slow electrons are usually
insufficient. A more general treatment of the problem requires solving
the system of integro-differential equations for the radial wave functions
of the external electron, which are analogous to the Hartree-Fock equations
in the multiconfigurational approximation of the atomic theory. In the
present paper, the authors give a deduction of equations describing the
excitation of an arbitrary level of a many-electron atom; so far, such
equations have been obtained for some special cases only (e.g., Ref. 1).
The radial equations derived here take account of the non-orthogonality
of the wave functions of the external and optical electrons; magnetic
interaction is neglected. The well-known non-uniqueness which appears
Card 1/2

AUTHORS: Rautian, S.G. and Sobel'man, I.I.

TITLE: On the Question of Negative Absorption

PERIODICAL: Optika i spektroskopiya, 1961, Vol.10, No.1, pp.134-135

TEXT: The authors consider conditions necessary for negative absorption (i.e. luminescence of higher intensity than absorbed light) by excited organic molecules. The level bands of such molecules (e.g. aromatic hydrocarbons) consist of singlet $(S_0, S_1, S_2, ...)$ and triplet $(T_1, T_2, ...)$ terms illustrated in a figure on p.134. If transitions from S_1 and T_1 to the higher vibrational states in S_0 represent intensity maxima in fluorescence and phosphorescence spectra, induced emission is greater than absorption, i.e. negative absorption occurs. To detect negative absorption, the following conditions should be satisfied: the excited molecules should not absorb frequencies which are of interest in this connection, phosphorescence should have a high quantum yield and there should be a sufficiently high concentration of excited atoms. There are 1 figure and 6 references.

Card 1/2

27193

Line shape and dispersion ...

with small $G^2 = \pi c \omega_{32}^3 \gamma_{32} N_\lambda$ (N_λ -total number of photons per unit volume) the forced transitions change the lifetime in the same way as the spontaneous transitions. With increasing G^2 the forced and spontaneous transitions are different. It is found that the solution of the problem is determined by the sign of $G^2 -(\gamma_2-\gamma_3)^2/4$. In the following, the authors study weak field and calculate the coefficient k_μ of forced emission. Under the condition $k_\mu \lambda \ll 1$, the imaginary part of the dielectric constant can be calculated from the emission coefficient $k_\mu \cdot \epsilon'(\omega_\mu) = (-\lambda/2\pi)k_\mu$. N.G. Basov, A.M. Prokhorov (Ref. 2: UFN, 57, 485, 1955) are mentioned. There are 5 figures and 19 references: 9 Soviet and 10 non-Soviet. The two most recent references to English-language publications read as follows: Ref. 16: R.I. Collins, D.F. Nelson, et. al., Phys. Rev. Lett., 5, 303, 1960; Ref. 17: P.P. Sorokin, M.J. Stevenson, Phys. Rev. Lett., 5, 557, 1960.

ASSOCIATION: Fizicheskiy institut im. P.N. Lebedeva Akademii nauk SSSR
(Physics Institute imeni P.N. Lebedev of the Academy of
Sciences USSR)

SUBMITTED: February 11, 1961
Card 2/2

Photodissociation of molecules as ...

31777
S/056/61/041/006/054/054
B111/B104

range ($\sim 10^3$ cm^{-1}) if the width of atomic emission lines is small (~ 0.01 — 0.1 cm^{-1}). This leads to high amplification factors k_ω. If E_ω varies little in the range of effective absorption, the following relation is satisfied:

$$k_\omega = \frac{\lambda^2 E_\omega \overline{K_\omega} A_{32} \Gamma}{4 \hbar \omega_0 A_3 \gamma}$$

, where λ denotes the wavelength, γ the line width, A_{32} the Einstein factor for the transition $3 \to 2$, A_3 the total decay probability of the third level, E_ω the spectral luminous density of excited radiation, K_ω the mean absorption coefficient, and Γ the absorption band width. For a direct atom excitation

$$M = \frac{A_{32} \cdot \Gamma}{A_3 \cdot \gamma} \cong 10 \text{ holds}$$

In the case of crystals, $M \sim 10^2$ — 10^3. If the absorption spectrum is assumed to be very wide, one has $M \sim 10^4$ — 10^5. If $\gamma = 0.03$ cm^{-1}, $\lambda = 1\mu$, and $\lambda_0 = 2000$ Å, one obtains $k_\omega = 0.3$ cm^{-1} already at low absorption energies of ~ 1 ω/cm^3. This value exceeds the threshold for the production of electromagnetic radiation. The greatest

Card 2/3

Photodissociation of molecules as ...

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S/056/61/041/006/054/054
B111/B104

difficulty in connection with this method is that photodissociation cannot be well established unless one of the atoms is in the resonant state. There are 1 figure and 8 references: 3 Soviet and 5 non-Soviet. The three most recent references to English-language publications read as follows: M. H. Maimann, Nature, 187, 493, 1960; P. P. Sorokin, M. J. Stevenson, Phys. Rev. Lett., 5, 557, 1960; W. Keiser et al., Phys. Rev., 123, 766, 1961.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute imeni P. N. Lebedev of the Academy of Sciences USSR)

SUBMITTED: October 19, 1961

Card 3/3

Excitation of atoms by heavy ...

$$\Omega(t) = \text{Re}\,\frac{1}{v}\int_0^{vt} dx\left\{\alpha - \left(V^2 + \frac{v^2}{2}\left[\frac{V''}{V}+i\frac{x}{v}\right]' - \frac{v^2}{4}\left[\frac{V''}{V}+i\frac{x}{v}\right]^2\right)^{1/2} - \right.$$

$$\left. - \left(V^2 + \frac{v^2}{2}\left[\frac{V''}{V}-i\frac{x}{v}\right]' - \frac{v^2}{4}\left[\frac{V''}{V}-i\frac{x}{v}\right]^2\right)^{1/2}\right\}. \qquad (11)$$

for the correction $\Omega(t)$ to the phase difference between $a_1(t)$ and $a_0(t)$, which is due to the potential $V(t)$. With the aid of Eq. (11) one obtains

$$|a_1(\infty)| = \left|\sin\int_{-\infty}^{\infty} V(t)\cos\left(\int_0^t \sqrt{\alpha^2(\tau)+4V^2(\tau)}\,d\tau\right)dt\right| \equiv |\sin J|. \qquad (13)$$

wherefrom

$$w = \left|\int_{-\infty}^{\infty} V(t)\cos\left(\int_0^t \sqrt{\alpha^2(\tau)+4V^2(\tau)}\,d\tau\right)dt\right|^2. \qquad (15)$$

is found for the transition probability of the nucleus into excited states.
Card 2/3

Excitation of atoms by heavy ...   S/056/62/043/002/023/053
                                          3104/3106

When the optically allowed transitions are excited (charge-dipole inter-
action), the effective transition cross section is obtained as

$$\sigma = 2\pi \int_0^\infty w\rho \, d\rho = 2\pi \left(\frac{\lambda}{v}\right) e^{-2\sqrt{2\beta}} I(\beta),$$ (27)

$$I(\beta) = \int_0^\infty \sin^2 \left(\frac{\pi}{x}\right) \exp \left\{-2 \left[\sqrt{2\beta + \beta^2 x^2} - \sqrt{2\beta}\right]\right\} x \, dx.$$ (28)

The calculations are made without successive approximation, and the
transition energy ΔE may have any value. There are 2 figures.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR
              (Physics Institute imeni P. N. Lebedev of the Academy of
              Sciences USSR)

SUBMITTED: February 13, 1962

Card 3/3

PRESNYAKOV, L., SOBELMAN, I.I., VAYNSHTEYN, L.A.

"One model for calculation of excitation cross sections for atoms."

Report submitted to the Third Intl. Conf. on the Physics of Electronics
and Atomic Collisions.   London, England   22-26 July 1963

SOBEL'MAN, Igor' Il'ich; KUZNETSOVA, Ye.B., red.; BRUDNO, K.F.,
    tekhn. red.

[Introduction to the theory of atomic spectra] Vvedenie v
teoriiu atomnykh spektrov. Moskva, Fizmatgiz, 1963. 640 p.
                                        (MIRA 16:12)

                    (Atomic spectra)

Schelman I. L.   10

ACCESSION NR: AP3004484   3/0048/63/027/008/0994/0995

AUTHOR: Sena, L. A.

TITLE: Second All-Union Conference on the Physics of Electron and Atom Col-
lisions [Uzhgorod, 2—9 October 1962]

SOURCE: AN SSSR. Izvestiya, ser. fiz., v. 27, no. 8, 1963, 994-995

TOPIC TAGS: conference, electron collision, atom collision, collision physics

ABSTRACT: The II Vsesoyuznaya konferentsiya po fizike elektronny*kh i atomny*kh
stolknoventy (Second All-Union Conference on the Physics of Electron and Atoms
Collisions), was held in Uzhgorod, 2—9 October 1962. The following reports
were presented: "Theory of the charge-exchange process during atomic collisions,"
by Yu. N. Demkov; "Charge-exchange of multicharge ions," by I. P. Flaks; "Ioniza-
tion due to atomic collisions," by N. V. Fedorenko; "Excitation of atoms and
molecules due to electronic collisions," by I. P. Zapesochny*y; "Charge exchange
and ionization during atomic collisions in the high-energy range," by V. S.
Nikolayev; "Photoionization of gases and vapors by vacuum ultraviolet radiation,"
by Academician A. N. Terenin and F. I. Vilesov; "Effective cross sections of

atomic collisions important in the theory of gaseous quantum generators," by
I. I. Sobel'man; "Dissociation of molecules and ions during collisions of fast
particles," by N. N. Tunitskiy; and "Corpuscular diagnostic of plasma," by
V. V. Afrosimov.

ASSOCIATION: none

AID Nr. 981-13   3 June
EMISSION BY ATOMS MOVING IN THE FIELD OF A STANDING WAVE (USSR)

Rautian, S. G., and I. I. Sobel'man. Zhurnal eksperimental'noy i teoretiche-
skoy fiziki, v. 44, no. 3, Mar 1963, 934-945. S/056/63/044/003/026/053

Equations describing atoms moving in the field of a standing wave composed of
two superposed waves of the same frequency traveling in opposite directions (the
case obtaining in quantum generators) are used to derive spontaneous emission
probability, stimulated emission probability, and generated power of the gas
quantum generator. Both weak and strong fields are considered, as well as spon-
taneous emission of atoms along and across the wave. The variation in peak in-
tensity of the narrow line is analyzed. The integral of narrow line intensity shows
the intensity to be a strong-field effect.   [BB]

Card 1/1

S/0056/63/045/006/2015/2021

ACCESSION NR: AP4009127

AUTHORS: Vaynshteyn, L.; Presnyakov, L.; Sobel'man, I.

TITLE: Concerning one model for calculating the effective excitation cross sections of atoms

SOURCE: Zhurnal eksper. i teoret. fiziki, v. 45, no. 6, 1963, 2015-2021

TOPIC TAGS: atom excitation, atom ionization, atom excitation by electron, atom ionization by electron, ionization cross section, atom ionization cross section, Born approximation, exchange effect, atom excitation model, wave function model

ABSTRACT: In view of the many shortcomings of the Born method for calculating the effective cross section for the excitation and ionization of atoms by electrons, which gives poor results in regions where the cross sections usually reach their maxima even when some modifications are made to the method, the authors investigate the possibility of a model which makes possible description of the atom-plus-electron system by means of relatively simple wave functions

Card 1/2

ACCESSION NR: AP4009127

with non-separating variables. The problem is solved with the
repulsion of the electrons taken into account even in the first
approximation, in the wave functions themselves. The calculations
are made with and without account of the exchange effect. Numerical
calculations were made with the aid of the formulas obtained of the
cross sections for the 1s -- 2p, 1s -- 2s, and 4s -- 5p transitions,
using an electronic computer, and the results obtained with the pro-
posed model give very good agreement with experiment. Orig. art.
has: 2 figures and 19 formulas.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR
(Physics Institute, AN SSSR)

SUBMITTED: 12Jun63   DATE ACQ: 02Feb64   ENCL: 00

SUB CODE: PH   NO REF SOV: 002   OTHER: 007

Card 2/2

AID Nr. 995-17   21 June

INDUCED RADIATIVE PROCESSES IN CLASSICAL AND QUANTUM
THEORIES (USSR)

It is shown that although induced emission is not a pure quantum effect, in the
quasi-classical limit the transition from quantum formulas is quite unique. In
particular, there is no classical analogue to the quantities determining the in-
duced emission power and the absorption power. The authors point out that
their analysis of induced emission in terms of classical theory is warranted
by the recent interest in masers and because a g e n e r a l classical theory for
the interaction of radiation of nonlinear oscillators with the field was never
fully developed. The article deals with a systematic development of the clas-
sical theory of radiative processes, compares in detail the classical theory
with the quantum theory, and shows that under certain conditions classical
systems can amplify incident radiation.   [CS]

Card 1/1

ACCESSION NR: AP4042387

AUTHORS: Poluektov, I.; Presnyakov, L.; Sobel'man, I.

TITLE: Collisions accompanied by charge exchange

SOURCE: Zh. eksper. i teor. fiz., v. 47, no. 1, 1964, 181-187

TOPIC TAGS: particle collision, charge exchange, Hermite matrix, hydrogen, helium

ABSTRACT: Pointing out that earlier difficulties with this problem were due to the use of non-Hermitian functions leading to non-normalized transition probabilities, the authors present a new formulation of the charge-exchange problem, which leads to a system of equations with a Hermitian matrix. An approximate method for integrating this system is developed, analogous to that previously proposed by two of the authors (L. A. Vaynshteyn, L. P. Presnyakov, I. I. Sobel'man, ZhETF v. 43, 518, 1962) for the excitation of atoms. A

1/2

L 29264-66   EWT(1)/EWT(m)/FCC/EWP(t)/EII   IJP(c)   GW/RM/GD

ACC NR: AP6019297   SOURCE CODE: UR/0203/65/005/004/0728/0734

AUTHOR: Gal'perin, Yu. I.; Sobel'man, I. I.

ORG: Institute of Physics of the Atmosphere, AN SSSR (Institut fiziki atmosfery AN SSSR); Physics Institute im. Lebedev, AN SSSR (Fizicheskiy institut AN SSSR)

TITLE: Possible role of metastable states of neon and argon in processes of post-luminescence of auroras

SOURCE: Geomagnetizm i aeronomiya, v. 5, no. 4, 1965, 728-734

TOPIC TAGS: neon, argon, aurora

ABSTRACT: A study has been made of the role of the processes of collisions of O_2 molecules with Ne and Ar atoms in metastable states, leading to dissociation of the O_2 molecule with the formation of excited oxygen atoms. The oxygen lines λ 8446 and 7774 A are emitted at the time of collisions with neon; the lines λ 5577 and 6300 A are emitted at the time of collisions with argon. The duration of post-luminescence at heights ~200 km can attain several seconds. Orig. art. has: 17 formulas and 1 table. [JPRS]

SUB CODE: 04 / SUBM DATE: 12Oct64 / ORIG REF: 008 / OTH REF: 009

Card 1/1   UDC: 550.388.8

L 53014-65   EWT(d)/EWT(l)/EPF(c)/EEC(k)-2/EPF(n)-2/EWG(v)/EEC-4/EPR/EEC(t)   Pn-4/
Pr-4/Pg-4/Pt-7/Pu-4/P1-4   IJP(c)   WW/WS-4   UR/0141/65/008/001/0057/0063

ACCESSION NR: AP5010677

AUTHOR: Presnyakov, L. P.; Sobel'man, I. I.

TITLE: Propagation of electromagnetic waves in a medium with inhomogeneous refractive index

SOURCE: IVUZ. Radiofizika, v. 8, no. 1, 1965, 57-63

TOPIC TAGS: electromagnetic wave propagation, refractive index, inhomogeneous material, reflection coefficient

ABSTRACT: An approximate method of integrating a system of linear differential equations with variable coefficients, developed by the authors previously to solve problems involving excitation of atoms by heavy particles (with L. Vaynshteyn, ZhETF v. 43, 518, 1962) is applied in this paper with slight modification to study the propagation of electromagnetic waves in a medium with a variable real refractive index, and to calculate the coefficient of reflection from a layer with an arbitrary real refractive index. An expression is derived for the absolute value of the coefficient of reflection. This expression goes over into the result given by geometrical optics in the case of long wavelengths and into the results given

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L 53014-65

ACCESSION NR: AP5010677   2

by the Born approximation in the case of small wavelengths. In the case when there
is an abrupt jump in the refractive index (i.e., when geometrical optics is not ap-
plicable), the same expression yields the Fresnel reflection. Several examples,
involving transmission through an optical system, abrupt and gradual transitions
between media, and above-the-barrier reflection are considered. The method can be
employed also for oblique incidence and modified for propagation of electromagnetic
waves in a waveguide. "We thank V. L. Ginzburg who called our attention to the
possibility of employing the method of the earlier paper to the propagation of
electromagnetic waves." Orig. art. has: 2 figures, 26 formulas, and 1 table.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR (Physics Institute
AN SSSR)

SUBMITTED: 27Jan64   ENCL: 00   SUB CODE: EM, OP

NR REF SOV: 004   OTHER: 001

Card 2/2

L-47362-65---EWT(1)

ACCESSION NR: AP5008757   S/0056/65/048/003/0965/0970

AUTHOR: Sobel'man, I. I.

TITLE: Excitation of atoms by electrons and broadening of spectral lines

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 48, no. 3, 1965, 965-970

TOPIC TAGS: excited atom, electron excitation, spectral line, line broadening, inelastic scattering, electron scattering, scattering cross section

ABSTRACT: The connection between the theory of spectral line broadening in a plasma and the theory of atomic collisions, established in earlier papers by the author (Optika i spektroskopiya v. 1. 617, 1956 and later) and by M. Baranger (Phys. Rev. v. 111, 481, 1958 and later) is used to formulate the conditions under which data on inelastic scattering of slow electrons by excited non-hydrogenlike atoms can be obtained from the broadening of the spectral lines. It is shown that a new possibility of experimentally investigating inelastic scattering by excited atoms can be obtained by separating the calculated electronic part of the line broadening from the measured width, for although measurement of the cross sections of transitions between excited states entails great difficulties, measurement of

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L-47362-65

ACCESSION NR: AP5008757 ∂

spectral line widths is a much simpler problem. The degree to which the Born approximation is applicable to excitation cross sections is discussed. As an example, the author considers the broadening of several lines, from which he estimates the cross sections for inelastic scattering atoms from the atom He and the ion Al^{++} at energies on the order of 3 eV. The cross sections found were in good agreement with those calculated in the Born approximation. "In conclusion, I thank L. A. Vaynshteyn for a discussion and for help in the work." Orig. art has: 1 figure, 16 formulas, and 1 table.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute, Academy of Sciences, SSSR)

SUBMITTED: 15Oct64   ENCL: 00   SUB CODE: NP

NR REF SOV: 007   OTHER: 007

Card 2/2 CC

L 12785-66   EWT(1)/EWA(m)-2   IJP(c)   AT

ACC NR: AP5026621   SOURCE CODE: UR/0056/65/049/004/1274/1283

AUTHORS: Alekseyev, V. A.; Sobel'man, I. I.

ORG: Physics Institute im. P. N. Lebedev, Academy of Sciences SSSR
(Fizicheskiy institut Akademii nauk SSSR)

TITLE: On a spectroscopic method of investigating elastic scattering
of slow electrons

TOPIC TAGS: electron scattering, elastic scattering, spectral line,
line width, electron polarization, line shift

ABSTRACT: A connection is established between the displacement or the
width of spectral lines near the limit of the spectral series, and the
amplitude for the scattering of the electrons by the perturbing atoms.
Account is taken of the contribution made to the scattering by an ar-
bitrary number of partial waves, with allowance for the exchange inter-
action and without any limitation imposed on the magnitude of the
scattering phase shift. The conditions under which the approximations
employed in the calculations are valid are discussed. The polarization

Card   1/2

L 12785-66

3

ACC NR: AP5026621

effect due to the interaction between the perturbing particles and the atomic remainder, which leads to a shift in the frequency of the atomic oscillator, is estimated. It is shown with argon as an example that the calculation of scattering phase shifts can be monitored with the aid of the experimental values of the shift and width of the spectral lines. Authors thank L. A. Vaynshteyn for a discussion. Orig. art. has: 3 figures, 40 formulas, and 1 table.

SUB CODE: 20/ SUBM DATE: 07May65/ NR REF SOV: 009/ OTH REF: 006

HW

Card   2/2

ACC NR: AP7007042   SOURCE CODE: UR/0203/66/006/004/0633/0649

AUTHOR: Gal'perin, Yu. I.; Poleuktov, I. A.; Sobel'man, I. I.

ORG: none

TITLE: Flux and energy spectrum of protons responsible for hydrogen luminescence in auroras

SOURCE: Geomagnetizm i aeronomiya, v. 6, no. 4, 1966, 633-649

TOPIC TAGS: aurora, solar wind, magnetic anisotropy, geomagnetism

SUB CODE: 08,04

ABSTRACT: The author draws on 65 Soviet and foreign sources in review of the proton spectrum responsible for H luminescence in auroras. It is concluded that soft protons, penetrating in a broad zone into the polar latitudes, play a very important role in the energy processes of excitation and ionization in "proton" auroras and in the energy balance of the upper atmosphere in the polar latitudes. However, at present there is no well-developed hypothesis on the origin of powerful low-energy fluxes of protons. Due to the regularity of appearance of the proton flux and its slight dependence on geomagnotic activity it can be postulated that these protons penetrate into the atmosphere from the "solar wind". The mean energy of these protons is close to the mean translational energy of the solar wind...In the case of conservation of magnetic moment of a proton the increase of magnetic field strength with motion from the boundary of the magnetosphere to the region of luminescence should lead to an appreciable increase of the isotropy of the flux of penetrating protons. Computations of the proton flux reveal that with a $H\alpha$-line intensity greater than 300 rayleighs the energy density of protons, even

Card 1/2   UDC: 550.388.8

ACC NR: AP7001744   SOURCE CODE: UR/0053/66/090/002/0209/0236

AUTHOR: Rautian, S. G.; Sobel'man, I. I.

ORG: none

TITLE: Effect of collisions on the Doppler broadening of spectral lines

SOURCE: Uspekhi fizicheskikh nauk, v. 90, no. 2, 1966, 209-236

TOPIC TAGS: particle collision, Doppler effect, spectral line, line broadening

ABSTRACT: This is a review article devoted to a detailed analysis of the effect of
collisons on Doppler broadening and to the relation of impact broadening on the Dop-
pler effect. The general treatment of the effect of collisions on pure Doppler broad-
ening is first discussed, neglecting possible interference with the vibrations of the
oscillator. Other causes of broadening, such as radiative decay, broadening due to
interaction of the emitting atom with the surrounding particles, are then discussed,
followed by a simultaneous account of radiative decay and the Doppler effect. Al-
though the effect of collisions on pure Doppler broadening is of interest in a number
of physical problems, it has been discussed in the past only within the framework of
the Brownian movement model. Consequently, the authors expand on this model and treat
Doppler broadening also by the kinetic equations method. Two types of collisions are
treated, those in which the phase and velocity change simultaneously, and those in
which either the phase alone or the velocity alone changes. The broadening due to
the interaction and to the Doppler effect is discussed both under the assumption that

Card 1/2   UDC: 535.353: 535.354

GRUCH, A., redaktor; SOBEL'MAN, I.M. [translator]; SILIN, Yu.S., redaktor;
LEVONEVSKAYA, L.G., tekhnicheskiy redaktor

Ukazatel' k kratkomu putevoditeliu po gorodu Leningradu. Explanatory
index to a short guide to Leningrad. [Leningrad] Lenizdat, 1956.
34 p. [Parallel texts in Russian and English.]   (MLRA 9:11)
        (Leningrad--Description--Guidebooks)

SOBEL'MAN, V.I. (Moskva)

Dependence of counting time on the duration and frequency of
accidental malfunctions of the machine. Zhur. vych. mat. i mat.
fiz. 1 no.1:163-168 Ja-F '61.   (MIRA 14:8)
                    (Electronic calculating machines)

31919
S/582/61/000/006/001/001
D299/D304

On the geometry of ferrite- ...

these 4 conditions are called in the following the set of systems. The set of (n + 1) systems is called a complete set. The speed of operation of the memory device depends mainly on whether the system of beads has simple decoding. Thus, it is possible to consider only systems, in which the beads are numerated according to the formula:

$$N = aj + bi \pmod{n} \qquad (3.1)$$

where j is the number of the column, and i – of the row, in which the selected core is found. For the case of greatest practical interest $n = 2^m$, no more than 3 such systems (i.e. systems based on formula (3.1)), can be constructed. The present article set forth methods for finding sets which consist of more than 3 systems of ferrite beads with $n = 2^m$, and whose decoding is simpler than that determined by formula (3.1). A description of the system by vector functions is given. The position of each core in a matrix of order $n = 2^m$, can be uniquely determined by the 2m-dimensional vector

$$z = (x_1, x_2, \ldots, x_m, y_1, y_2, \ldots, y_m) \qquad (4.1)$$

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On the geometry of ferrite- ...

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D299/D304

of S systems for any $n = 2^m$, it is sufficient that S systems can be constructed for $n_1 = 2^{m_1}$ and $n_2 = 2^{m_2}$. Further, ferrite bead systems with simple decoding are considered, i.e. systems where

$$u_i = g_i(x_i, y_i).$$ (5.1)

It is found that the set cannot have more than 3 systems with decoding (5.1). The vector functions

$$G^1(z) = (x_1, x_2, \dots, x_m),$$
$$G^2(z) = (y_1, y_2, \dots, y_m),$$ (5.7)
$$G^3(z) = (x_1 \sim y_1, x_2 \sim y_2, \dots, x_m \sim y_m)$$

are pairwise parallel, i.e. the systems they describe constitute a set. The system described by $G^3(z)$ for $n = 2, 4, 8$ $(m = 1, \dots, 3)$. is shown a figure. In the following, a set is sought which has a much greater number of systems (compared to the 3 systems of formula (5.1)) and yet is as simple in decoding. For this purpose.

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On the geometry of ferrite- ...

the vector function

$$G(z) = (g_1(z_{j_1}, z_{s_1}), g_2(z_{j_2}, z_{s_2}), \ldots, g_m(z_{j_m}, z_{s_m})) \qquad (6.1)$$

$$z = (z_1, z_2, \ldots, z_{2m})$$

where

is considered. Such systems have a decoding of type $\qquad (6.2)$

$$u_i = g_i(z_{j_i}, z_{s_i})$$

which is as simple as (5.1). The systems considered above are par-
ticular cases os systems described by vector functions of type
(6.1). Theorem 6.1. The set of parallel vector-functions cannot
contain more than $(2 \log_2 n + 1)$ vector functions of type (6.1).
By constructing the set of 7 parallel vector-functions of type
(6.1) for $n = 16$; 32 ($m = 4.5$), it is possible to construct a set
of 7 systems with decoding (6.2) for any $n = 2^m$ (m 3). The con-
struction of a set of many parallel vector-functions (6.1) is cum-
bersome; it is considerably facilitated by the criterion of paral-
Card 5/6

SOBEL'MAN, Ye.I.

Some characteristics of postigneous solutions and the problem of temperature and pressure in mineral thermometry. Sov.geol. 5 no.1:93-103 Ja '62. (MIRA 15:2)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova. (Mineralogy)

SOBELMAN, YE.I. [Sobelman, Ye.I.]

Some peculiarities of postmagmatic solutions and problem of temperature
and pressure in mineralothermometry. Analele geol geogr 14 no.4:34-
46 O-D '62.

SOBEL'MAN, Ye.I.

Phase relations in singular systems and complexes and the types of
nonvariant and multisystems. Geokhimiia no.6:542-548 Je '64.
(MIRA 18:7)

1. Gosudarstvennyy nauchno-issledovatel'skiy institut tsvetnykh metal-
lov, Moskva.

DOBROVTSVETOV, B.L.; BRADISLAVSKAYA, Yu.I.; SHEBABE, Ye.I.

Solid solutions in the system Zn_2SiO_4 – Fe_2SiO_4. Dokl. AN SSSR 158 no.1:189-191 S-O' 64   (MIRA 17:8)

1. Gosudarstvennyy nauchno-issledovatel'skiy institut tsvet-nykh metallov. Predstavleno akademikom N.V. Belovym.

SOBELOVA, A.

A rare case of the Creutzfeldt-Jakob disease. Cesk. neurol. 29
no.1:65-68 Ja '66.

1. Neurologicke oddeleni Thomayerovy nemocnice v Praze (vedouci
doc. dr. J. Simek).

9. Monthly List of Russian Accessions, Library of Congress, _____September_____ 1953, Uncl.
                                                                              2

SOBENIN, M.V.

Mechanized cleaning of the castings of the cylinder block of the D-48 diesel engine. Trakt. i sel'khozmash. 32 no.12:36-37 D '62. (MIRA 16:3)
(Diesel engines)

SOBENIN, M.V.

Automatic line for removing burr from diesel-engine block castings.
Biul.tekh.-ekon.Gos.nauch.-issl.inst.nauch.i tekh.inform. no.1:20-
22 '63.   (MIRA 16:2)

(Grinding machines)

SCHEIN, M.P, Cand ---(diss) "... *guide* ...
... in ... a ... electrode
linear ... ." ..., 1961. 8 , (... f Higher Education USSR.
... Physics Inst), 120 ... (11,(7-6), 130)

SOBENIN, N.P.

Determining constant phase velocity in a septate wave guide by means of "phase comparison". Nek.vop.inzh.fiz. no.3:108-116 '58.   (MIRA 12:5)
(Wave guides)

SOV/120-58-4-2/30

AUTHORS: Val'dner, O. A., Sobenin, N. P.

TITLE: Measurement of the Variable Phase Velocity in a Waveguide by
the Phase-Meter Method (Izmereniye peremennoy fazovoy skorosti
v volnovode metodom fazometra)

PERIODICAL: Pribory i tekhnika eksperimenta, 1958, Nr 4, pp 19-21
(USSR)

ABSTRACT: A phase meter, the block diagram of which is shown in Fig. 1, was
used in determining phase velocity. The method consists of finding the
phase differences $\Delta\varphi$ between the cells of a waveguide con-
structed of a large number of irises. For this purpose the
coupling loop of the system is inserted successively into two
neighbouring cells of the waveguide, the probe of the stand-
ard measuring line is suitably adjusted, and in each case a
minimum reading of the indicator is found. The phase differ-
ence $\Delta\varphi$ between the cells is equal to the electrical length
of the shift of the probe. The average phase velocity over
a segment D can be found from:

$$v_{cp} = 2\pi D/\lambda\Delta\varphi \tag{1}$$

where λ is the wavelength in free space. The method of
measurement is subject to some errors. In particular, an

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SOV/120-5 -4-2/30

Measurement of the Variable Phase Velocity in a Waveguide by the
Phase-Meter Method

error is caused by the presence of the reflected wave in the
standard line and it is shown that the maximum error caused
by this effect can be expressed by Eq.(3) where r is the
modulus of the reflection coefficient. The second error is
due to the wave reflected from the output terminal of the
iris-cell waveguide. The relative error in determining the
phase velocity v , due to this effect, can be determined
from Eq.(4) where D is the length of one cell and ΔD
is the linear tolerance for a cell. The method was
used experimentally to determine the velocity in a system where
the cell length D varied from 12.1 to 26.54 mm, aperture
of the iris ranged from 23.7 to 30.27 mm, diameter of the
waveguide was between 91.84 and 87.85 mm and the thickness
of the iris was 4 mm. The results are plotted in Fig 3.

Card 2/3

SOV/120-58-4-2/30

Measurement of the Variable Phase Velocity in a Waveguide by the Phase-Meter Method

where the circles indicate the experimental points while the smooth curve was calculated. The paper contains 3 figures and 6 references; 3 of the references are English and 3 are Soviet.

ASSOCIATION: Moskovskiy inzhenerno-fizicheskiy institut (Moscow Engineering-Physics Institute)

SUBMITTED: September 28, 1957.

Card 3/3

S b r   , N. P.

21(9)   PHASE I BOOK EXPLOITATION   SOV/2003

Moscow.   Inzhenerno-fizicheskiy institut

Lineynyye uskoriteli; sbornik statey (Linear Accelerators; Collection of Articles)
    Moscow, 1959. 94 p. 1,000 copies printed.

Ed.: G. A. Tyagunov, Doctor of Technical Sciences, Professor; Tech. Ed.:
    R. A. Negrimovskaya.

PURPOSE: This collection of articles may be useful to engineers engaged in
    the development, production and application of linear accelerators.

COVERAGE: The authors discuss the theory and operation of linear accelerators
    developed by MIFI. They describe methods of measuring variable phase velocity
    in a waveguide of a linear electron accelerator and discuss ways of determining
    the diameter of a waveguide. A method of improving the energy spectrum at
    the output of an accelerator is also discussed. No personalities are mentioned.
    References appear at the end of each article.

Card 1/6

Linear Accelerators; (Cont.)

There are 6 references: 3 Soviet and 3 English.

Glazkov, A. A. The Amplitude of the Fundamental Wave (TM) in a Diaphragm-type Waveguide   32

The author generalizes the procedure for calculating the amplitude of the accelerating wave in a linear electron accelerator, depending on geometrical parameters and operating conditions of a waveguide. It is shown that the value of the fundamental wave decreases when higher-order modes are taken into account in calculations. The author also derives an expression for partial power of the accelerating harmonic. It is shown that partial power depends on the distribution of amplitudes of harmonics at the axis of the waveguide. The author also discusses methods of obtaining the function of amplitude distribution. He presents numerical results of the calculation of partial power, which may be used in practical application. He also describes possible methods of experimental study of higher harmonics in a waveguide. There are 15 references: 6 Soviet and 9 English.

Card 3/6

Linear Accelerators; (Cont.)   SOV/2003

Shal'nov, A. V., and S. P. Lomnev. Preliminary Bunching of Electrons in a
Linear Accelerator by Means of a Klystron Resonator   64

    The authors study the axial motion of particles in a waveguide resonator
of a linear electron accelerator with a klystron preresonator. Methods of
analyzing electron bunching are also presented. The authors suggest
plotting the output characteristics of a waveguide resonator as a function
of output parameters (terminal energy and phase) and the phase of the high-
frequency field of a particle entering the klystron resonator. They also
present two numerical examples illustrating the advantageous effect of
preliminary bunching by means of a klystron. The authors also discuss the
injection characteristics of two types of resonators and present the
phase-energy characteristics of a klystron resonator. There are 8 references:
5 Soviet, 2 English, and 1 French.

Glazkov, A. A., and Ye. G. Pyatnov. Problems of Improving the Energy Spectrum
    of Electrons at the Output of a Linear Accelerator by Shifting the Phase
    $180°$.   79

    The authors present a theoretical study of a method of shifting the
phase $180°$ as a means of reducing energy scattering at the output of a

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SOBENIN, N. P.

PHASE I BOOK EXPLOITATION   SOV/5134

Moscow. Inzhenerno-fizicheskiy institut

Uskoriteli; sbornik statey (Accelerators; Collection of Articles)
    Moscow, Atomizdat, 1960. 163 p. Errata slip inserted. 3,600
    copies printed.

Sponsoring Agency: Ministerstvo vysshego i srednego spetsial'nogo
    obrazovaniya RSFSR.

Ed. (Title page): G. A. Tyagunov, Doctor of Technical Sciences,
    Professor; Tech. Ed.: S. M. Popova.

PURPOSE: This collection of articles is intended for persons design-
    ing and constructing accelerators, and for technical personnel
    specializing in the field of superhigh frequencies.

COVERAGE: The book contains articles by staff members of the De-
    partment of Electrophysical Installations of the MIFI (Moscow Engi-
    neering Physics Institute) reflecting theoretical and experimental
    investigations of linear electron accelerators, betatrons and

Card 1/5

Accelerators (Cont.)   SOV/5134

synchrotrons; one article deals with ion sources for cyclotrons.
The theoretical papers on linear electron accelerators are a
continuation of a similar research paper published in the col-
lection of articles "Lineynyye uskoriteli" (MIFI edition, 1959)
on the dynamics of particles in these machines. The theoretical
papers on particle trapping for acceleration conditions in
betatrons and synchrotrons contain a mathematical solution of
this problem which takes into account the collective interaction
of particles in the beam and the inductive properties of that
beam at the moments of onset and break. A number of experimental
investigations deals with measurements at shf and with electron
accelerator and betatron components, while a special study is con-
cerned with the linear cyclic accelerator ("elutron") proposed a
few years ago by one of the coauthors of the article in question.
No personalities are mentioned. References accompany most of the
articles.

TABLE OF CONTENTS:

Card 2/5

9.1300

AUTHOR;   Sobenin, N.P.

TITLE: Comparison of phasometric systems

TEXT: Phasometric systems of different types are theoretically compared,
which are used for experimental checking of phase velocity in the waveguide of an
electronic linear accelerator. The analysis shows that any of the systems con-
sidered makes it possible to determine, on the basis of difference measurements,
the constant and variable phase velocity in a corrugated waveguide with a suffi-
cient for practical purposes accuracy. Experimental data, obtained by the phaso-
metric method, agree with data obtained by the resonance method and the method of
reflecting piston with an accuracy of $\pm 0.5\%$.

                                                A. Talyzin

[Abstracter's note: Complete translation]

Card 1/1

24387

S/142/60/003/005/014/015
E192/E382

9,1300

AUTHOR: Shal'nov, A.V. and Sobenin, N.P.

TITLE: Selective Characteristics of a Disc-loaded Waveguide

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy,
          Radiotekhnika, 1960, Vol. 3, No. 5, pp. 524 - 529

TEXT: In the investigation of the frequency stability of a
supply source feeding a linear electron accelerator, it is
necessary to know the relationship between the changes of the
phase velocity in a disc-loaded waveguide and the frequency
changes. The solution of the problem can be based on the
scattering equation which relates the geometric parameters
of the waveguide to the frequency. However, equations of this
type (Ref. 1 - E.L. Chu, W.W. Hansen - J. Appl. Phys., 1947,
Vol. 18, No. 11; Ref. 2 - W. Walkinskaw - Phys. Soc., 1948,
Vol. 61, No. 2, 246; Ref. 3 - W. Walkinskaw - J. Appl. Phys.,
1949, Vol. 20, No. 6) cannot be solved explicitly with respect
to phase velocity. It is therefore convenient to employ for
this purpose the Grojean--Vanhuyse formula (J1, Nuvo Cimento,
1955, Vol. 1, No. 1 - Ref. 5), which is valid for a wide range
 Card 1/10